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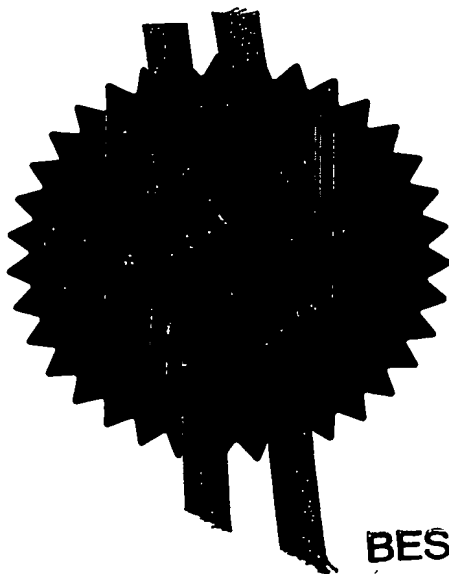
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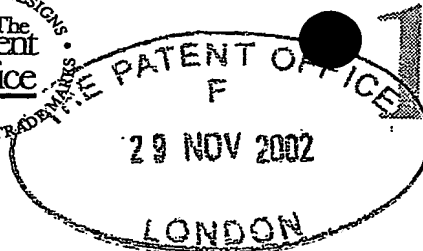
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1. Your reference

6.70.1034 UK

02DEC02 E767560-4 000073
POL/7790 0.00-0227926.3

2. Patent application number

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0227926.3

29 NOV 2002

3. Full name, address and postcode of the or of each applicant (underline all surnames)

INTERBREW S.A.
VARSTRAAT 94
B-3000 LEUVEN
BELGIUM

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

A BELGIAN CORPORATION

7906530002

4. Title of the invention

COOLING SYSTEM FOR ALCOHOL
BEVERAGE DISPENSING APPARATUS

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

G.F. REDFERN & CO.
LYNN HOUSE
IVY ARCH ROAD
WORTHING
WEST SUSSEX. BN14 8BX

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1412002

8435356001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

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Priority application number
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Date of filing
(day / month / year)

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Number of earlier application

Date of filing
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

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Patents Form 1/77

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Continuation sheets of this form

Description

10

Claim(s)

3

Abstract

1

Drawing(s)

2 x 2 SW

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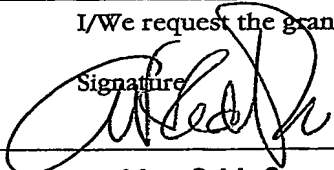
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Date

29 November 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

Mrs. S.M. Camp
01903 820466

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- 1 -

COOLING SYSTEM FOR ALCOHOL BEVERAGE DISPENSING APPARATUS

Field of the Invention

The present invention relates to a cooling system for use in an alcohol beverage dispensing apparatus and in particular, relates to a cooling system having temperature control that maintains a beer beverage at a desired serving temperature.

Background of the Invention

Beer dispensing apparatus are known in the art for dispensing of draft beer in taverns and the like. Typically, the beer is chilled prior to being dispensed by passing through a conical run of tube that passes through a chilled compartment containing ice and water. In some instances the compartment is refrigerated. Such draft beer dispensers are utilized in taverns where the large volumes of beer are dispensed everyday and the taverns have room to store such chillers. This is not the case for a domestic or home beer dispensing apparatus that is adapted to sit on a countertop in a kitchen where space is at a premium.

Further, due to limited countertop space requirements, there still is

a need to chill or cool the beer in the dispensing apparatus to desired serving temperatures and to maintain the beer in the dispenser at the desired serving temperature.

Summary of the Invention

It is an object of the present invention to provide an alcohol dispensing apparatus that maintains the beer in the apparatus at a desired serving temperature wherein, once the beverage in the keg is cooled to the desired serving temperature, multiple servings of the beverage in a short time period may be dispensed with each serving being dispensed substantially at the same desired serving temperature for the beverage.

The present invention relates to a cooling apparatus for cooling a keg containing an alcohol beverage which is preferably beer. The cooling apparatus has a first temperature sensor mounted in heat sensing relation with a bottom portion of the keg to sense first temperatures related to temperature of the beverage at the bottom portion of the keg and a second temperature sensor mounted in heat sensing relation with an upper portion of the keg to sense second temperatures related to temperature of the beverage at the upper portion of the keg. The cooling apparatus includes a cooling controller responsive to the first and second temperature sensors for controlling operation of the cooling apparatus to extract heat from the bottom portion of the keg to lower and maintain temperature of the beverage contained in the keg at a desired beverage serving temperature.

Preferably, the cooling apparatus operates to extract heat from the keg when either one, or both, of the first and second temperature sensors sense temperature below the desired beverage serving temperature. The controller cycles the cooling apparatus off when both the first and second

temperature sensors sense temperature indicative of the beverage being at its desired beverage serving temperature. The controller cycles the cooling apparatus off when the first temperature sensor senses temperature associated with the beverage freezing.

In accordance with an aspect of the present invention there is provided a beer or like alcohol beverage dispensing apparatus comprising a keg containing beer or like alcohol beverage and having a bottom portion and an upper portion remote from the bottom portion. The dispensing apparatus has a keg dispensing device extending into the keg to the bottom portion to draw the beverage from the keg adjacent the bottom portion. The dispensing apparatus has a cooling apparatus in heat transfer contacting relation with the keg for extracting heat from the beverage contained in the keg through the bottom portion of the keg to thereby cool the beverage. The cooling apparatus comprises a first temperature sensor mounted in heat sensing relation with a bottom portion of the keg to sense first temperatures related to temperature of the beverage at the bottom portion of the keg and a second temperature sensor mounted in heat sensing relation with an upper portion of the keg to sense second temperatures related to temperature of the beverage at the upper portion of the keg. The cooling apparatus includes a cooling controller responsive to the first and second temperature sensors for controlling operation of the cooling apparatus to extract heat from the bottom portion of the keg to lower and maintain temperature of the beverage contained in the keg at a desired beverage serving temperature.

Brief Description of The Drawings

For a better understanding of the nature and objects of the present invention reference may be had to the accompanying diagrammatic

drawings in which:

Figure 1 is a front elevation view of a home beer dispensing apparatus in accordance with the present invention;

Figure 2 is a side elevation view of the home beer dispensing apparatus; and,

Figure 3 is a side sectional view of the keg shown inside the beer dispensing apparatus of Figure 2 having a dispensing spear within the keg and a cooling system for cooling the contents of the keg.

Detailed Description Of The Invention

Referring to Figures 1 and 2 there is shown a home beer dispensing apparatus, appliance or unit 10. The dispensing apparatus 10 is primarily intended for use in domestic kitchens but may also be used in utility rooms, garages, domestic bars, caravans etc. While the preferred embodiment relates to dispensing beer, alternatively carbonated solutions or other alcohol beverages may be dispensed by apparatus 10.

The home beer dispensing apparatus 10 has a front wall 12 and a dispensing tap 14 protruding forward of the front wall 12. A drip tray 16 also protrudes forward of the front wall 12 and is adapted to support an open glass container 18 below the dispensing tap 14. The home beer dispensing apparatus 10 further has a base 21 adapted to rest on a counter top in a kitchen. The front wall 12 is formed as an extension of two pivoting side walls 20 which may be moved between closed and open positions to allow the keg 22 (see Figure 2 in broken lines) to be inserted into the housing of the home beer dispensing apparatus 10. The housing of the home beer dispensing apparatus 10 further includes a top wall 24 and a rear wall 26. The rear wall 26 has a grill 30 that permits for air circulation within the home beer dispensing apparatus 10. An electrical

cord 32 extends through the rear wall 26 of the apparatus 10 to provide a connection into a main electrical supply to supply electrical power to the electrical components housed within the dispensing apparatus 10. Alternatively, a 12 Volt DC supply input may be used.

The dispensing apparatus 10 has a cooling system 23 located behind and below keg 22 that is adapted to cool the keg 22 of beer when placed in dispensing apparatus 10. The dispensing apparatus 10 also dispenses the beer by providing a pressurised air supply (not shown).

Referring to Figure 3, the keg 22 of the present invention is shown in more detail. The keg 22 has a general cylindrical shape with side walls 40 and a top wall or top portion 42 and a bottom wall or bottom portion 44. Both top wall 42 and bottom wall 44 are curved upwardly from the central portion of the keg 22 and are provided with a raised annular collar 46. The collars 46 provide additional support for the keg 22. Mounted within the keg walls 40, 42 and 44 is a plastic bag 50 for containing alcohol beverage which in the preferred embodiment is, beer 52.

As shown in Figure 3, the keg is filled completely with beer 52 within the bag 50 and as a result the bag 50 lines the inside walls of the keg 22. As the beer 52 is dispensed from the keg 22, an air pressure is established between the walls of the bag 50 and the inside surfaces of walls 40, 42 and 44 of the keg so as to provide pressure to the bag allowing the beer 52 to be dispensed from the keg 22.

The top portion 42 and collar 46 located in the top portion 42 of keg 22 has a keg dispensing device or valve 60 extending through the top collar 46. The keg dispensing device 60 is connected to the tap 14 of the beer dispensing apparatus 10 by a tube connection (not shown) extending from the keg dispensing device 60 at its top end 62. The dispensing

device 60 has a spear 66 that extends into the keg 22 within bag 50 so as to provide a remote opened end 64 adjacent the bottom portion 44 of the keg for drawing beer 52 from the keg adjacent the bottom portion 44 of the keg 22. Beer 52 is drawn through opening 64, up hollow spear 66 out through end 62 to the tap 14 (Figure 1).

The cooling of the keg 22 within the beer dispensing apparatus 10 is accomplished by a cooling apparatus 23 comprising cooling plate 70 having a cooling surface 72 that in the preferred embodiment is in mechanical and heat transfer contacting relation with the bottom portion of the keg 22 for extracting heat from the beer 52.

The cooling apparatus further includes a Peltier thermoelectric device 80 mounted in mechanical and thermal heat transfer contacting relation with the cooling plate 70. The Peltier thermoelectric device 80 is connected through a suitable leads and transformer (not shown) to the power supply line or cord 32 (see Figure 2) so that a voltage is applied across the Peltier thermoelectric device 80. The voltage drop across this Peltier cooling device 80 results in a thermal difference being generated across the device whereby surface 82 of Peltier device 80 is cooler than hot surface 84. As a consequence, heat is extracted from the cooling plate 70 which in turn extracts heat from the keg 22. The Peltier thermoelectric device 80 provides a low rate of continuous cooling.

As a result of the Peltier cooling device 80 acting through cooling plate 70 to extract heat from the beer 52 within the bottom portion 44 of the keg 22, a stratification effect occurs in the initial cooling of the beer prior to the beer reaching its desired serving temperature. That is to say, that the beer contained in the lower portion of the keg has a tendency to be colder than the beer contained in the upper portions of the keg. This

stratification effect also occurs naturally with warmer beer tending to rise to the top of the bag 50 in keg 22. Also the selection of keg material may effect the stratification layers formed by temperature differences in the beer. A keg 22 selected from materials such as stainless steel and steel have greater inherent stratification effects than a keg selected from aluminum. The stratification effect of the temperature of the beer 52 becomes less of a problem once all the beer 52 is cooled to a suitable serving temperature.

However, the Peltier thermoelectric device must be controlled in a manner that does not result in the temperature of the beer freezing. If the beer 52 freezes adjacent the open end 64 of the spear 66, clearly, it will be difficult or even not possible to dispense beer from the keg 22.

The present invention provides a first temperature sensor 90 which is positioned to sense the temperature of the keg outer wall 40 adjacent the lower portion 44. It should be understood that the sensor 90 may be placed at any suitable location against the keg and is supported within the home beer dispensing apparatus 10. The sensor 90 could alternatively be located on the bottom wall portion 44 of the keg 22. The purpose of sensor 90 is to sense temperatures associated with the temperature of the beer 52 contained in or adjacent the bottom portion 44 of the keg 22. The temperature sensor 90 provides a signal indicative of sensed temperature to controller 94 which is supported within the apparatus 10. Controller 94 may comprise any suitable electronic controller including a CPU. The controller 94 in response to having a temperature sensed by sensor 90 that corresponds to the temperature at which the beer 52 freezes adjacent the bottom portion 44, sends a signal along line 96 to the Peltier cooler 80 to de-energize or result in the Peltier cooler 80 cycling into an off or lower

cooling condition. It should be understood that the Peltier cooler 80 by its very nature in effect has a continuous current flow through it, however, the signal line 96 may reduce this current so that the cooling effect on the beer 52 at the bottom portion 44 of the keg is reduced significantly thereby prevents beer 52 from freezing.

The present invention provides a second temperature sensor 92 located supported in apparatus 10 to be mounted adjacent or heat sensing relation with an upper portion 41 of the keg 22. In Figure 3, the second temperature sensor 92 is illustrated to contacts the side wall 40 of the keg 22 above the center line of the keg. It should be noted that for the purposes of the present invention, the sensors 90 and 92 must be spaced sufficiently far enough apart in order for the sensors to provide adequate readings of the temperatures associated with beer at the top portion 41 and the bottom portion 44 of the keg 22.

While the preferred embodiment and throughout the specification and claims reference is made to two temperature sensors, it should be understood that multiple sensors such as three or four temperature sensors may be provided in order to provide different temperature readings for the beer in the keg 22.

The purpose of the second temperature sensor 92 is to sense temperatures of the beer 52 at locations within the keg 22 remote from where the heat is being extracted from the keg 22. This provides an adequate temperature sensing within the apparatus 10 that monitors the stratification effect of temperature variations of the beer 52 for beer that is located further away from the cooling plate 70.

The temperature sensor 92 sends a signal indicative of the temperature of the beer 52 adjacent the upper portion 41 of the keg 22 to

controller 94. When this signal indicates that beer 52 adjacent the upper portion 41 has reached the desired serving temperature of the beer 52. The controller 94 de-energizes cooling plate 70. The signal from temperature sensor 92 overrides any signal provided from temperature sensor 90 associated with the beer 52 located adjacent the lower portion 44 indicating that the beer 52 in the bottom portion 44 of keg 22 has reached its desired serving temperature from having controller 94 de-energize cooling plate 70. However, once both sensors 90 and 92 provide an indication to controller 94 that the beer 52 within the keg 22 has reached a desired serving temperature the controller 94 reduces the extraction of heat through the cooling plate 70 so as to maintain the temperature of the beer 52 contained within the keg 22 at its desired serving temperature. It should be understood that the first temperature sensor 90 may be sensing temperatures below the desired beverage serving temperature while the second temperature sensor 94 is sensing temperatures above the desired beverage serving temperature as the beer temperature profile in the keg 22 follows a hysteresis loop profile due to the stratification effect. As long as the bottom sensor 90 does not sense a temperature associated with the freezing temperature of beer, the beer in keg 22 is cooled until sensor 92 generates a signal indicative of the beer in the upper portion of the keg has reached the desired beverage serving temperature.

It should also be noted that the home beer dispensing apparatus 10 may have insulation provided in it's front wall 12, side walls 20, rear wall 26 and top wall 24. The insulation is provided to insulate the keg 22 from the surrounding environment of the apparatus 10 so that the beer 52 is maintained at a cooler temperature while conserving on the energy used

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- 10 -

to operate on the Peltier device 80.

WHAT IS CLAIMED IS:

1. A beer or like alcohol beverage dispensing apparatus comprising:

a keg containing beer or like alcohol beverage and having a bottom portion and an upper portion remote from the bottom portion;

a keg dispensing device extending into the keg to the bottom portion to draw the beverage from the keg adjacent the bottom portion;

a cooling apparatus in heat transfer contacting relation with the keg for extracting heat from the beverage contained in the keg through the bottom portion of the keg to thereby cool the beverage, the cooling apparatus comprising:

a first temperature sensor mounted in heat sensing relation with a bottom portion of the keg to sense first temperatures related to temperature of the beverage at the bottom portion of the keg;

a second temperature sensor mounted in heat sensing relation with an upper portion of the keg to sense second temperatures related to temperature of the beverage at the upper portion of the keg; and,

a cooling controller responsive to the first and second temperature sensors for controlling operation of the cooling apparatus to extract heat from the bottom portion of the keg to lower and maintain temperature of the beverage contained in the keg at a desired beverage serving temperature.

2. The apparatus of claim 1 wherein the controller cycles the cooling apparatus on when either one, or both, of the first and second temperature sensors sense temperature below the desired beverage serving temperature.

3. The apparatus of claim 1 wherein the controller cycles the

cooling apparatus off when the both the first and second temperature sensors sense temperature indicative of the beverage being at its desired beverage serving temperature.

4. The apparatus of claim 1 wherein the controller cycles the cooling apparatus off when the first temperature sensor senses temperature associated with the beverage freezing.

5. The apparatus of claim 2 wherein the controller cycles the cooling apparatus off when the first temperature sensor senses temperature associated with the beverage freezing.

6. The apparatus of claim 4 wherein the controller cycles the cooling apparatus off when the first temperature sensor senses temperature associated with the beverage freezing.

7. The apparatus of claim 2 wherein the controller cycles the cooling apparatus off when the both the first and second temperature sensors sense temperature indicative of the beverage being at its desired beverage serving temperature.

8. The apparatus of claim 7 wherein the controller cycles the cooling apparatus off when the first temperature sensor senses temperature associated with the beverage freezing.

9. The apparatus of claim 1 wherein the keg has a top portion through which the keg dispensing device extends into the keg.

10. The apparatus of claim 9 wherein the keg dispensing device comprises a hollow spear having a remote open end adjacent the bottom portion of the keg for drawing the beverage therethrough and out of the keg.

11. The apparatus of claim 1 wherein the cooling apparatus comprises a cooling plate in heat transfer relation with bottom portion of

the keg for extracting heat therefrom and a Peltier thermoelectric device in heat transfer relation with the cooling plate for extracting heat from the cooling plate.

12. The apparatus of claim 1 further comprising insulated walls surrounding the keg.

13. The apparatus of claim 1 wherein the beverage is contained in a bag housed within the keg, and the keg dispensing device is connected to the bag and extends into the bag.

COOLING SYSTEM FOR ALCOHOL BEVEAGE DISPENSING APPARATUS

ABSTRACT

A beer dispensing apparatus has a cooling apparatus adapted for cooling a keg containing beer. The cooling apparatus has a first temperature sensor mounted in heat sensing relation with a bottom portion of the keg to sense first temperatures related to the temperature of the beer at the bottom portion of the keg. The cooling apparatus has a second temperature sensor mounted in heat sensing relation with an upper portion of the keg to sense second temperatures related to the temperature of the beverage to the upper portion of the keg. The controller controls the cooling apparatus in response to the first and second temperature sensors so as to control the operation of the cooling apparatus to extract heat from the bottom portion of the keg to lower and maintain the temperature of the beverage contained in the keg to a desired beverage serving temperature. The use of the first and second temperature sensors spaced apart from each other to sense the temperatures of the beer contained in different portions of the keg results in the cooling apparatus being able to maintain the beer at a desired serving temperature without stratification temperature effects occurring within the keg and as a consequence, multiple servings of the beverage may be dispensed from the keg within a short time period at substantially similar or constant desired beverage serving temperature.

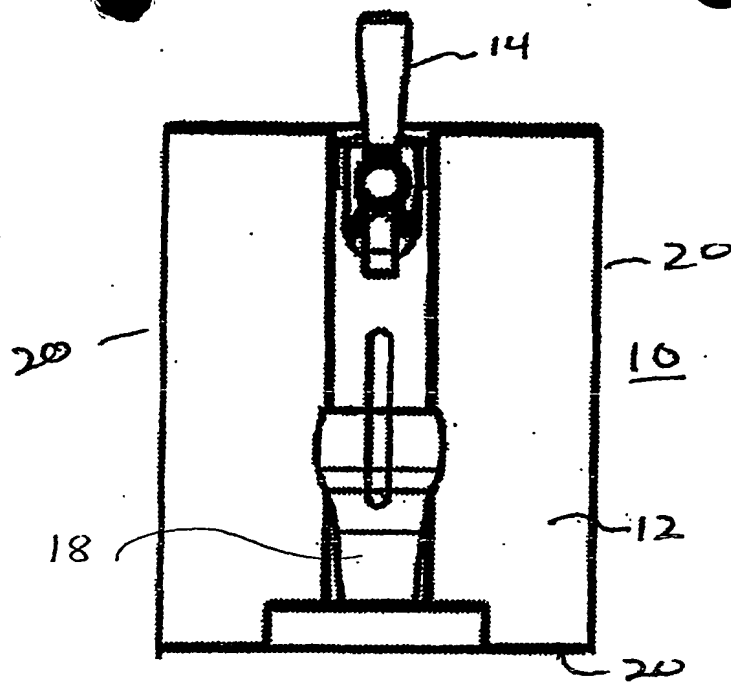


FIG. 1

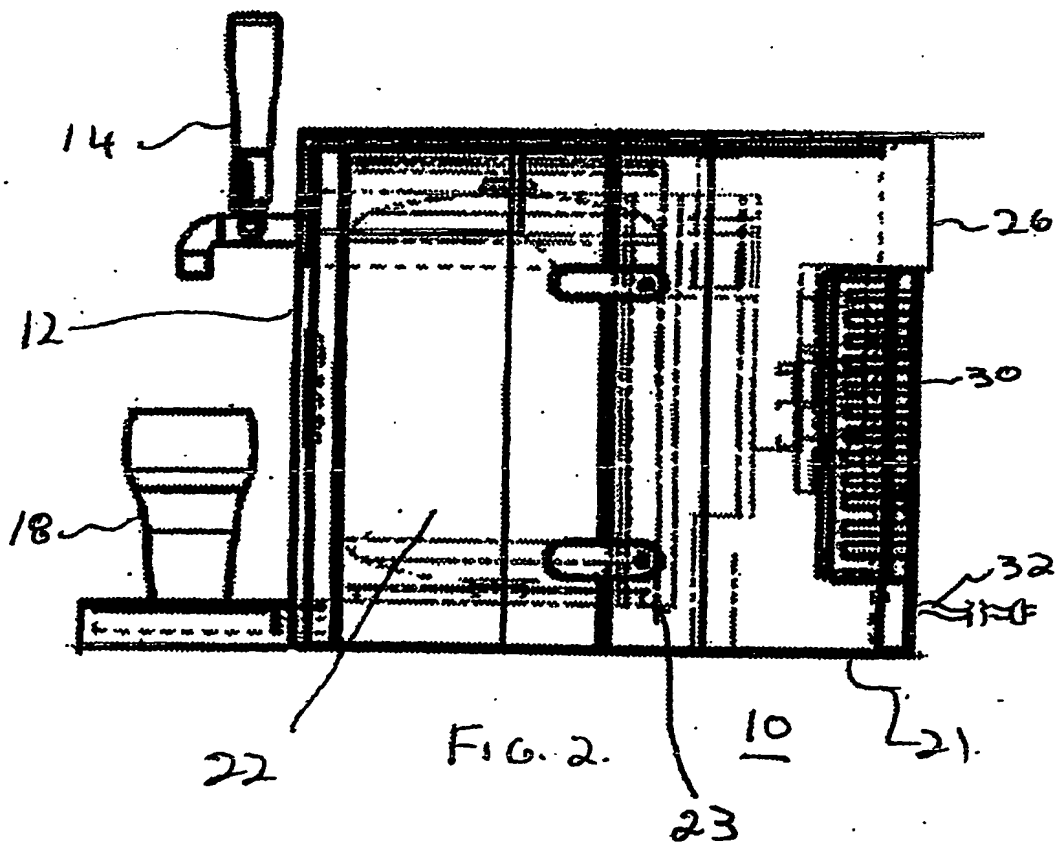
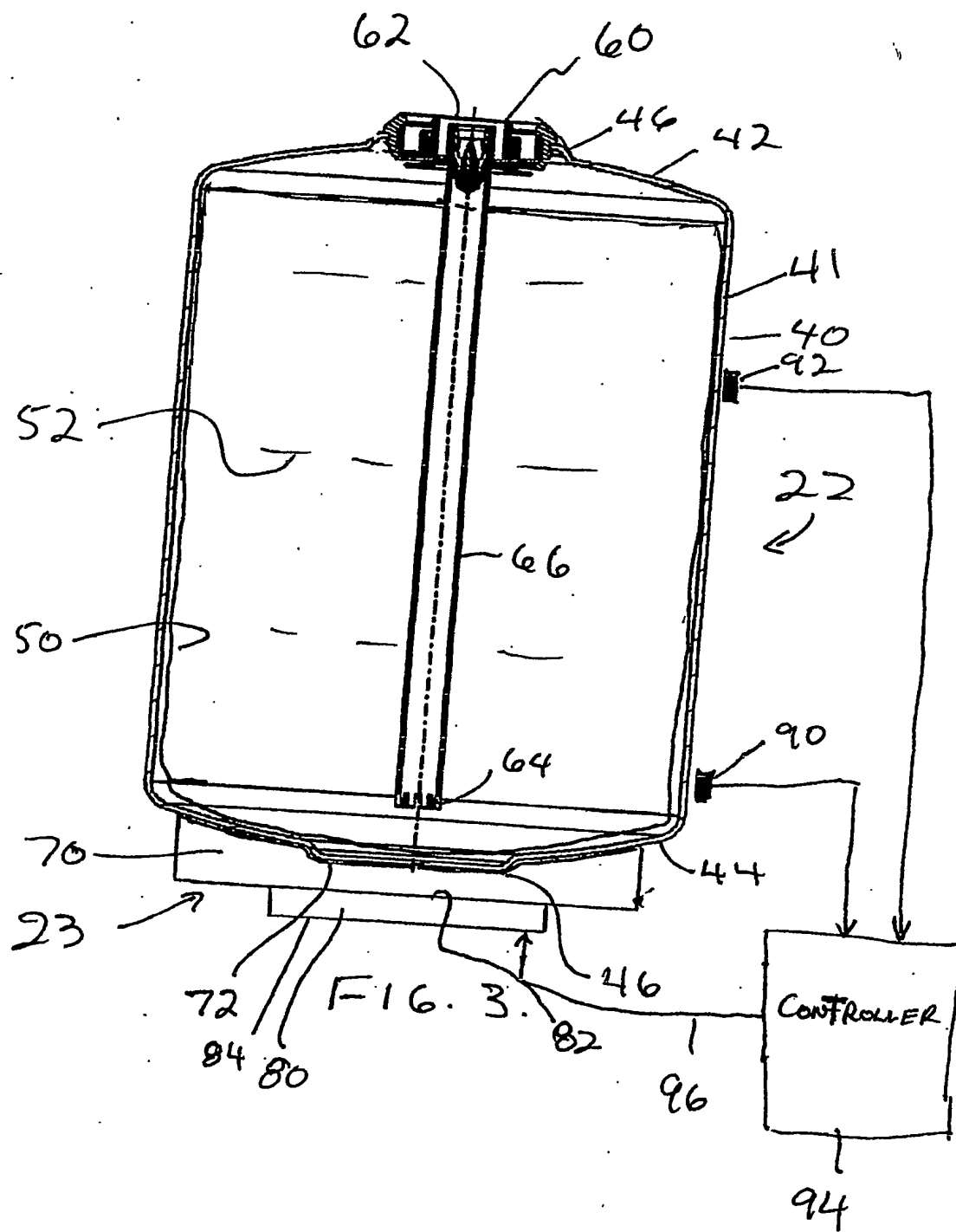


FIG. 2.



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